



WINFORM

Via Garda,6 30027 San Donà di Piave (VE)

Reference:	Winform Ozonators	
Document:		
First Issue:	24/04/2020	Last revision date
Revision		Pages: 6 in total

OSONIZZATORI WINFORM

WINFORM OSONATORS

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Date: 24/04/2020	Date: 24/04/2020	Date: 24/04/2020

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SANITIZATION AND OZONE

The sanitization of an environment/surface can be obtained with different methods.

One of the **MOST EFFECTIVE** is through the oxidation process that leads to the alteration of the cellular composition of the attacked element.

Ozone is a molecule characterized by a high oxidative potential (2.07 V redox potential¹).

Substance	Redox potential (V)
Fluorine	2.87
Hydroxyl radical (OH ⁻)	2.86
Persulphate Ione (S ₂ O ₈ ²⁻)	2.60
Atomic Oxygen (O)	2.42
Ozone (O₃)	2.07
Hydrogen peroxide (H ₂ O ₂)	1.78
Chlorine (Cl)	1.36
Chlorine Dioxide (ClO ₂)	1.27
Oxygen (O ₂)	1.23

Table 1²

THE ACTION OF OZONE

The oxidizing action carried out by ozone has meant that, since its discovery, it has been used as a bactericidal, fungicidal and inactivating agent for viruses (Table 2).

The choice of ozone was based on its efficiency since it is more effective than other disinfectants towards a wider spectrum of microorganism.

ORGANISM	CONCENTRATION	EXPOSITION TIME
BACTERIA (<i>E. Coli, Legionella, Mycobacterium, Fecal Streptococcus</i>)	0.23 ppm – 2.2 ppm	<20 minutes
VIRUS (<i>Poliovirus type-1, Human Rotavirus, Enteric virus</i>)	0.2 ppm – 4.1 ppm	<20 minutes
MOLDS (<i>Aspergillus Niger, vari ceppi di Penicillum, Cladosporium</i>)	2 ppm	60 minutes
FUNGUS (<i>Candida Parapsilosis, Candida Tropicalis</i>)	0.02 ppm – 0.26 ppm	<1,67 minutes
INSECTS (<i>Acarus Siro, Tyrophagus Casei, Tyrophagus Putrescentiae</i>)	1.5 ppm – 2ppm	30 minutes

Table 2³

¹ Redox potential is a measure of the oxidation or reduction state of a medium; it is measured in volts (V)

² Source: Italian Ministry of Health

³ Source: Italian Ministry of Health

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OZONE AGAINST VIRUSES

Virus inactivation occurs rapidly after ozonation.

In fact, it has been observed that the inactivation curves show a rapid reduction of the bacterial culture up to 99%. The remaining 1% requires more time for total inactivation.

The mechanism of action of ozone on viruses is certainly not that of destruction, as in the case of bacteria, but of inactivation. The action of ozone consists of an oxidation, and consequent inactivation, of the specific viral receptors used for the creation of the bond with the cell wall to be invaded.

This blocks the viral reproduction mechanism at its first stage: cell invasion⁴.

SURFACE COMPATIBILITY

Ozone has a high degree of compatibility with most materials unlike other means used for sanitizing which in the short term corrupt the surfaces they come into contact with.

The table below shows the degree of compatibility with some materials used to make objects commonly found in our homes.

ABS	Good
Aluminum	Good/Decent
Polycarbonate	Excellent
Polypropylene	Moderate
Plexiglass [Poly (methyl methacrylate)]	Excellent
CPVC (Chlorinated polyvinyl chloride)	Excellent
Glass	Excellent
304 stainless steel	Good

ADVANTAGES IN USING THE OZONE

- ✓ Sanitization of the environment kept free by pathogenic microorganisms/virus inactivation
- ✓ Environment deodorization
- ✓ Greater oxygenation of the environmental microclimate
- ✓ Lesser risk of contagion
- ✓ Great compatibility with the treated surfaces

OZONATORS

The most suitable device, in terms of efficacy, speed and comfort, to sanitize a space by means of the ozone-induced oxidative process is undoubtedly the Ozonator.

The ozonator is a device able of producing ozone and of diffusing it in a room/space.

⁴ Source: Italian Ministry of Health – “ **DIPARTIMENTO DELLA SANITÀ PUBBLICA VETERINARIA DELLA SICUREZZA ALIMENTARE E DELLA NUTRIZIONE** - SEGRETERIATO NAZIONALE DELLA VALUTAZIONE DEL RISCHIO - *UFFICIO IV*”

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TYPE OF OZONATORS

There are several types of ozonators. The most common are those with UHV lamps and corona discharge ozone generators.

UHV LAMP

The air is taken from the environment by means of a fan and then passed through a UHV lamp to generate ozone. They are inefficient and unsuitable for sanitizing environments unless using very expensive systems.

CORONA DISCHARGE OZONE GENERATOR

This kind of ozonator produces ozone through the passage of air in a very high intensity electric field maintained and controlled through piezoelectric elements.

There are **pure oxygen ozonators**, which take the air to be ozonated from oxygen tanks, and **natural air ozonators** that take the air from the environment.

Natural air passage ozonators are safer, more effective and sturdier.

WinForm Ozonators belong to this last model: **NATURAL AIR passage.**

HOW TO CHOOSE YOUR OZONATOR

The choice of the ozonator must be made considering the size of the environment that you want to sanitize and the goal you want to pursue.

It is possible, in fact, to think about sanitizing only areas with high passage of people and/or permanence such as waiting rooms, bathrooms, changing rooms, or to systematically sanitize the whole environment.

Each one needs to find an ozonator that can produce enough ozone to sanitize the environment in a reasonable time.

The capacity of the ozonators is measured in their ability to produce ozone in a defined period of time. By convention, the capacity is measured in grams of ozone produced in one hour (gr/h)⁵.

WinForm produces two models of ozonator:



10 gr/h (10,000 mg/h)



40 gr/h (40,000 mg/h)

⁵ Editor's note: Some manufacturers use the unit of measurement instead of grams

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Now that we know the unit of measurement of the ozonators, we are interested, however, in how it relates to the surface of the room that I want to sanitize.

There is no scientifically agreed criterion on the amount of ozone needed to sanitize an environment. In principle, by averaging the data released by different manufacturers and considering the available bibliography, we considered plausible that 1gr of ozone is suitable for sanitizing between 20 and 30 m³ in about 1 hour.

WinForm ozonator with a capacity of 10 g/h can sanitize over 240 m³/h.
WinForm ozonator with a capacity of 40 g/h can sanitize over 800 m³/h.

To calculate how long the ozonator will take to sanitize, we therefore must calculate how many m³ the environment in which we want to install it is composed.

To calculate the m³, we must know the surface in square meters and multiply it by the height of the ceiling.
Example: 20 sq m room with a 3 m ceiling = 60 m³

Now that we know the cubature of the room we intend to sanitize and that we know that 1 gr of ozone sanitizes 20/30 m³/h, we can choose the ozonator.

SOME EXAMPLES

Example 1 = room of 10 sq m with ceiling height 3 m

Room surface m ²	Room cubature m ³	Ozonator capacity	Time to sanitize <i>(considering 1 gr/h for 30 m³)</i>
10	30	500 mg/h	About 120 minutes
10	30	1 g/h	About 60 minutes
10	30	5 g/h	About 12:50 minutes
10	30	10 g/h	About 6 minutes

Example 2 = room of 20 sq m with ceiling height 3 m

Room surface m ²	Room cubature m ³	Ozonator capacity	Time to sanitize <i>(considering 1 gr/h for 30 m³)</i>
20	60	500 mg/h	About 240 minutes
20	60	1 g/h	About 120 minutes
20	60	5 g/h	About 30 minutes
20	60	10 g/h	About 15 minutes

Example 3 = room of 80 sq m with ceiling height 3 m

Room surface m ²	Room cubature m ³	Ozonator capacity	Time to sanitize <i>(considering 1 gr/h for 30 m³)</i>
80	240	500 mg/h	NA
80	240	1 g/h	About 480 minutes
80	240	5 g/h	About 120 minutes
80	240	10 g/h	About 60 minutes

Remember: 1gr of ozone sanitizes between 20 and 30 m³ in about 1 hour.

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RISKS RELATED TO A WRONG USE

It is very important to know that ozone is toxic and that a wrong use of the ozonator can cause serious damage/death.

The user must be trained on the proper use of the ozonator to guarantee the safety for him/her and others.

NEVER USE the ozonator in presence of people and/or animals.

Use it after wearing a protective mask.

Aerate the room or wait at least 30 minutes before entering an ozonized space.